PSYCHE

A JOURNAL OF ENTOMOLOGY

ESTABLISHED IN 1874

VOL. XXXIX MARCH - JUNE, 1932 Nos. 1-2

TABLE OF CONTENTS

J. H. Emerton. *Nathan Banks* 1

Biological Notes on Cuban Wasps and Their Parasites. *Richard Dow* 8

A New Species of Dicælus from Southern Florida. *H. C. Fall* 19

New Species of Cryptocephalus (Coleoptera; Chrysomelidæ). *H. C. Fall* 21

An Effective Method for Collecting Ectoparasites from Live Animals and Birds. *Lawrence H. Dunn* 26

The Thatching Ant, *Formica obscuripes* Forel. *A. C. Cole, Jr.* 30

Two Brief Historical Notes. *J. G. Myers* 34

A Female Intermediate between *Papilio glaucus* and its form *turnus* (Lepid: Papilionidæ). *Harold O'Byrne* 35

Dendroides canadensis Latreille-Synonymy. *H. S. Barber* 36

A Wireworm Double Monster (*Limonius canus* Lec., Elateridæ, Coleoptera). *Chas. E. Woodworth* 37

Two New Species of East African Cleridæ (Coleoptera). *A. B. Wolcott* 41

Amblyomma dissimile Koch, a Tick Indigenous to the United States (Acarina: Ixodidæ). *J. Bequaert* 45

A Gynergate of Myrmecia. *George S. Tulloch* 48

Book Notice 52

CAMBRIDGE ENTOMOLOGICAL CLUB

OFFICERS FOR 1932

President . . . . . C. W. COLLINS
Vice-President . . . . . C. W. JOHNSON
Secretary . . . . . J. W. JOHNSTON
Treasurer . . . . . F. H. WALKER
Executive Committee . . . J. BEQUAERT
. . . F. M. CARPENTER
. . . S. M. DOHANIAN

EDITORIAL BOARD OF PSYCHE

EDITOR-IN-CHIEF

C. T. BRUES, HARVARD UNIVERSITY

ASSOCIATE EDITOR

F. M. CARPENTER

CONSULTING EDITORS

C. W. JOHNSON, Boston Society of Natural History.
NATHAN BANKS, Harvard University.
A. L. MELANDER, College of the City of New York.
A. P. MORSE, Peabody Museum, Salem, Mass.
THOMAS BARBOUR, Cambridge, Mass.
J. G. NEEDHAM, Cornell University.
W. M. WHEELER, Harvard University.

PSYCHE is published quarterly, the issues appearing in March, June, September, and December. Subscription price, per year, payable in advance: $2.00 to Subscribers in the United States; foreign postage, 25 cents extra, Canada 15 cents. Single copies, 65 cents.

Cheques and remittances should be addressed to Treasurer, Cambridge Entomological Club, Museum of Comparative Zoology, Cambridge, Mass.

Orders for back volumes, missing numbers, notices of change of address, etc., should be sent to F. M. Carpenter, Museum of Comparative Zoology, Cambridge, Mass.

IMPORTANT NOTICE TO CONTRIBUTORS

Manuscripts intended for publication, books intended for review, and other editorial matter, should be addressed to Professor C. T. Brues, Museum of Comparative Zoology, Cambridge, Mass.

Authors contributing articles over 8 printed pages in length will be required to bear a part of the extra expense, for additional pages. This expense will be that of typesetting only, which is about $2.00 per page. The actual cost of preparing cuts for all illustrations must be borne by contributors; the expense for full page plates from line drawings is approximately $5.00 each, and for full page half-tones, $7.50 each; smaller sizes in proportion.

AUTHOR'S SEPARATES

Reprints of articles may be secured by authors, if they are ordered before, or at the time proofs are received for corrections. The cost of these will be furnished by the Editor on application.

Entered as second-class mail matter at the Post Office at Boston, Mass. Acceptance for mailing at special rate of postage provided in Section 1103, Act of October 3, 1917, authorized on June 29, 1918.

PSYCHE

A Journal of Entomology

Volume XXXIX

1932

Edited by Charles T. Brues

Published by the Cambridge Entomological Club
Institute of Biology
Cambridge, Mass., U. S. A.

Digitized by the Internet Archive
in 2024

https://archive.org/details/psyche_march-june-1932_39_1-2

PSYCHE

VOL. XXXIX MARCH-JUNE, 1932 Nos. 1-2

J. H. EMERTON

By Nathan Banks

James Henry Emerton was born at Salem, Massachusetts, March 31, 1847, where, as a boy, he attended the local school. He was rather frail and a young helper in his father's drug store, George F. Markoe, interested the boy in outdoor life. They collected plants, insects and shore invertebrates and at the age of fifteen he was frequently visiting the Essex Institute, where he became acquainted with A. S. Packard, F. W. Putnam, John Robinson, Caleb Cooke, and others who later became more or less prominent students of Natural History.

From the first he showed much skill in drawing and made sketches of a great variety of natural objects. He took no lessons in the art, and his later skill in this as well as in modeling was of his own initiative.

In 1868 in the American Naturalist advertiser there appeared the following:—"James H. Emerton, Zoölogical and Botanical Draughtsman, Salem, Mass., is prepared to execute drawings on paper or wood for Zoölogical Subjects. Especial attention given to the delineation of Insects. References: Editors of American Naturalist."

Of these early drawings there are many in Packard's "Guide" and forty quarto plates in Watson and Eaton "Botany of the Fortieth Parallel" published in 1871. He was elected to the Boston Society of Natural History in

History. He was the Secretary and principal support of this society until his death.

He was a founder of our Society, for many years an officer, and one of our most regular attendants, often speaking and exhibiting specimens. Some years ago under the auspices of the Club he arranged for two series of public lectures on entomology, giving one lecture himself. He always seemed to be in good health, and collected spiders only a few months before his death, December 5, 1931.

Aside from being a naturalist he was an artist for the sake of art. He painted hundreds of water colors, often depicting the sea, the shore, or ships. For several seasons this was done at Ipswich, and in later years he went regularly in July to Gloucester for painting. He frequently exhibited before art societies, and lived for many years in an artist's studio apartment.

His principal interest and work was on the taxonomy and distribution of the spiders of New England and Canada. His method of sifting leaves, moss and detritus brought to light great numbers of the smaller forms. At first he sent these to the Rev. O. P. Cambridge in England, who described them; later he began his famous series of New England Spiders, publishing the Theridiidæ in 1882. The plates in these papers were especially valuable; those in the second part (Epeiridæ) containing some of his finest drawings. It is these illustrations that give the characteristic appearance of the parts which have given to Mr. Emerton much of his importance as an arachnologist. Cambridge, in reviewing Hentz's Spiders of the United States (Nature, 1876) refers to Emerton's two plates as follows:—"In point of accurate detail and artistic finish these figures are immeasurably in advance of those engraved from Hentz's drawings."

The series on New England spiders was followed by four supplements, two papers on Canadian spiders and numerous smaller articles, describing in all over 350 species, always with useful illustrations. No other writer has so thoroughly figured his species, old as well as new.

In several papers he traced the distribution of certain

northern spiders. Several of his early articles dealt with the habits of spiders and, even to the last, he loved to watch each autumn for the flying spiders.

He gave to the Museum of Comparative Zoölogy the first set of the types of his descriptions, his private collection and library he willed to the writer.

His bibliography is as follows:—

The habits of spiders. American Nat., II, 476-481, 1868.
The Ant-lion. American Nat. IV, 1871.
Notes on spiders from caves in Kentucky, Virginia and Indiana. American Nat., IX, 278-281, 1875.
(Notes and two plates) Hentz Spiders of the United States. Occ. Pap. Boston Soc. Nat. Hist., II, 1875.
Simon's Les Arachnides de France, Tome I, 1874. American Nat., IX, 108-109, 1875.
Spiders common to New England and Europe. Psyche, I, 129-131, 1876.
A comparison of the spiders of Europe and North America. Proc. Boston Soc. Nat. Hist., XIX, 68-72, 1877.
Descriptions of two new spiders from Colorado. Bull. U. S. Geol. Geog. Surv. Terr., III, 528-529, 1877.
Cocoon making and egg-laying of spiders. Psyche, II, 33-34, 1877.
Oviposition in spiders. Psyche, II, 123-124, 1877.
The structure and habits of spiders. 180 pp., S. E. Cassino, Salem, 1878.
Life on the seashore, or animals of our coast and bays. 143 pp. Naturalist Handy Series, Salem, 1880.
Breeding habits of spiders. American Nat., XIV, 595, 1880.
(Mating of Xysticus). American Nat., XIV, 595, 1880.
Spider webs. Bull. Essex Institute, IX, 67, 1881.
New England spiders of the family Theridiidæ. Trans. Connecticut Acad. Sci., VI, 1-86, 1882.
The cobwebs of Uloborus. American Journ. Sci., (3) XXV, 203-205, 1883.
New England spiders of the family Epeiridæ. Trans. Connecticut Acad., VI, 295-342, 1884.

New England spiders of the family Lycosidæ. Trans. Connecticut Acad. Sci., VI, 481-505, 1885.

New England spiders of the family Ciniflonidæ. Trans. Connecticut Acad. Sci., VII, 443-458, 1888.

Habit of Vespa. Psyche, V, 54, 1888.

Habits of Mygale in confinement. Psyche, V, 54, 1888.

Walckenaer's names of American spiders. Psyche, V, 113-114, 1888.

Pairing of Xysticus triguttatus. Psyche, V, 169, 1889.

New England spiders of the families Drassidae, Agelenidæ and Dysderidæ. Trans. Connecticut Acad. Sci., VIII, 166-206, 1890.

New England spiders of the family Attidae. Trans. Connecticut Acad. Sci., VIII, 220-252, 1891.

New England spiders of the family Thomisidæ. Trans. Connecticut Acad. Sci., VIII, 359-381, 1892.

Canadian spiders. Trans. Connecticut Acad. Sci., IX, 400-429, 1894.

Common spiders of the United States. 243 pp., Ginn and Company, 1902.

Cocoons and young of Coniopteryx. Psyche, XIII, 74-75, 1906.

A female spider with one male palpus. Psyche, XIV, 40, 1907.

Supplement to New England spiders. Trans. Connecticut Acad. Sci., XIV, 171-236, 1909.

New spiders from New England. Trans. Connecticut Acad. Sci., XVI, 383-407, 1911.

Four burrowing Lycosa (Geolycosa Montg. Scaptocosa Banks) including one new species. Psyche, XIX, 25-36, 1912.

(Comstock's Spider Book). Review. Ent. News, 1913, 35-37.

New and rare spiders from within fifty miles of New York City. Bull. American Mus. Nat. Hist., XXXII, 255-260, 1913.

The spiders of three mile island. Appalachia, XII, 154-156, 1913.

New England spiders identified since 1910. Trans, Connecticut Acad. Aci., XVIII, 209-224, 1913.
New spiders from the neighborhood of Ithaca, N. Y. Journ. New York Ent. Soc., 1914, 262-264.
Geographical distribution of spiders in New England. Appalachia, XIII, 143-159, 1914.
Recent collections of spiders from Newfoundland and Labrador. Ent. News, 1914, 117-118.
New spiders from New England XI. Trans. Connecticut Acad. Sci., XX, 133-144, 1915.
Canadian spiders II. Trans. Connecticut Acad. Sci., XX, 145-160, 1915.
New spiders from Canada and adjoining states. Canadian Entom., 1917, 261-272; No. 2, ibid, 1919, 105-108; No. 3, ibid, 1923, 238-243; No. 4, ibid, 1925, 65-69; No. 5, ibid, 1926, 115-119.
Recent studies in Canadian spiders. Canadian Entom., 1917, 13-16.
Spiders in the Adirondacks. Ent. News, 1917, 59-60.
Studies on Canadian Spiders in summer of 1917. Canadian Entom., 1918, 128-129.
A new house spider. Ent. News, 1918, 74.
Transcanadian spiders. Rept. Ent. Soc. Ontario, 1918.
Notes on the spiders collected by Frits Johansen of the Denmark Expedition 1906-08 to Northeastern Greenland, Latitude 76½ to 77 North. Vidensk. Medd. Dansk Naturf. Fören., LXX, 143-145, 1918.
The flights of spiders in the Autumn of 1918. Ent. News, 1919, 165-168.
Spiders. Rept. Canad. Arctic Exped., 1913-18, III, part H., p. 3H to 6H. 1919.
Catalogue of the spiders of Canada known to the year 1919. Trans. Royal Canadian Inst. 1919, 309-338.
Notes on Canadian and Arctic spiders. Psyche, XXVIII, 165-168, 1921.
Recent collections of Canadian spiders. Canadian Entom. 1924, 122-124.
Early history of the Cambridge Entomological Club. Psyche, XXXI, 1-6, 1924.

New spiders from southern New England. Psyche, XXXI, 140-145, 1924.
New Californian spiders. Pan Pacific Entom, I, 29-31, 1924.
Spiders from the Lake Abitibi Region. Univ. Toronto Studies, Biol. Ser. No. 32, 45-46, 1928.
Spiders of Nantucket. 4 pp. sep. publ., 1930.
Spiders of Nantucket. Nantucket Maria Mitchell Assoc., III., No. 2, 161-172. 1930.

BIOLOGICAL NOTES ON CUBAN WASPS AND THEIR PARASITES

By Richard Dow

The material for the following notes was collected in Cuba during August and September, 1930. Through a scholarship from the Atkins Foundation, I was enabled to spend nearly five weeks at the Harvard Biological Laboratory near Cienfuegos, Santa Clara. The laboratory is located on the Atkins sugar estate, Central Soledad, and the situation is ideal for this sort of work.

I wish to thank the following people who have assisted me by determining material: Professor Nathan Banks, Mr. H. S. Barber, Dr. A. G. Böving, Miss E. B. Bryant, Mr. R. A. Cushman, Mr. Carl Heinrich, and Mr. J. A. G. Rehn. I am also indebted to Mr. S. C. Bruner of Santiago de las Vegas, Cuba, for permission to publish his observation on *Chlorion cubensis*, and Professor Joseph Bequaert, who has read my manuscript and identified all of the Vespidæ. Although the synonymy of these wasps is more or less tangled, I am using the names which will soon appear in a work on the West Indian Vespidæ by Dr. Bequaert and Dr. George Salt.

Chlorion (Ammobia) dubitatum (Cress.)

I found several nests of this species in a shallow clay pit near Belmonte, Central Soledad. They consisted of a

vertical shaft, ten or more centimeters deep, and a sloping tunnel, five or six centimeters long, which ended in a single cell. I found extra cells in only one nest, but there may have been several cells in each burrow, which I failed to find because the tunnels were stopped up.

In all the completed cells, the larvæ had spun their cocoons, leaving only a few chitinous fragments of the prey, such as wings, legs, and ovipositors. From an examination of these remains, Mr. J. A. G. Rehn was able to assign them to Conocephalus sp.

The cocoon is composed of three layers. The whitish outer layer is yellowish at the apex, finely woven, and transparent; the middle layer is a thicker envelope of the same material; the brown inner layer is closely associated with the middle envelope and probably formed of some waste secretion. The meconium is apparently voided within the inner layer, and its concave upper surface is smooth and shining like the inside of the cocoon.

In the four adult females which I caught at this locality, none of the abdominal segments are wholly black, and only traces of the typical black coloration remain.

Chlorion (Ammobia) cubensis Fern.

Mr. S. C. Bruner found this species with a paralyzed long-horned grasshopper at Sante Fé, Isla de Pinos, September 6, 1928. The grasshopper, determined by Mr. J. A. G. Rehn, was a mature female of *Neoconocephalus maxillosus* (Fabr.). The wasp was dragging its prey through open piney woods. It was holding the fore part of the grasshopper's body and walking backwards. Mr. Bruner watched the wasp climb the trunk of a tree, still pulling its prey behind it, until it reached a height of about two meters. The wasp and grasshopper were then captured. This suggests a similar habit of *Sphecius speciosus* (Drury), which preys on cicadas. When Sphecius is taking a heavy cicada to its burrow, it frequently drags its prey up a tree, and then, taking advantage of the height attained, flies directly to the nest.

Sceliphron assimile (Dahlb.)

This species and *Sceliphron cæmentarium* are very closely related, and the nests are found in similar places. The nests of *assimile* are common in Soledad; one lot was taken from the palm thatching of a house near Vilches Potrero, and another from the walls of the buildings at the main entrance of the estate.

The prey of this species consists entirely of spiders. Some of the prey from these nests was identified by Miss E. B. Bryant as follows: a large number of Epeiridæ represented by males and females of *Epeira oaxacensis* Keys. and *Epeira fuscovittata* Keys., mostly immature and mostly *oaxacensis;* a few Thomisidæ represented by immature and adult females of Misumena sp.; one adult female of the Sicariidæ, Scytodes sp.; and one immature male of the Attidæ, Phidippus sp.

A few spiders were also collected from nests of Sceliphron in the lighthouse at Punta de los Colorados, near Cienfuegos, on September 4. Since *Sceliphron assimile* is the only species of Sceliphron which I found in that locality, these spiders were probably stored by that species. The prey was determined by Miss Bryant as follows: a small number of immature Oxyopidæ represented by males and females of *Peucetia viridans* (Hentz); two adult Epeiridæ, females of *Epeira prompta* Hentz; and two adult Clubionidæ, a male and female of *Chiracanthium inclusum* (Hentz).

The cocoon of *assimile* is approximately cylindrical, rounded at the apex, and narrowed toward the posterior end. I found one larva which had died after spinning the silken foundation of its cocoon. I cannot be certain that this is complete at the posterior end of the larva, and I am inclined to believe that the meconium is a true stercoral plug, which is excreted after the cocoon is finished. Before the larva begins its resting period, it also secretes a substance which colors the cocoon yellowish brown and makes it brittle in texture. When the mature wasp is about to emerge, it bites an irregular hole in the side of the

cocoon near the top, then softens the clay with a liquid secreted from the mouth. The adult also excretes some tiny white elongate pellets, presumably from the anus. This is the fifth distinct excretory or secretory product, the others being the silken part of the cocoon (from the mouth), the meconium or stercoral plug (from the anus), the excretion or secretion which permeates the silk (from the mouth ?), and the secretion which softens the clay cell.

Associated with *Sceliphron assimile* were an ichneumonid parasite, a dermestid beetle, and a vespid inquiline, *Pachodynerus nasidens* (Latr.). The ichneumonid is *Acroricnus cubensis* (Cress.) [R. A. Cushman]. When Cresson described this species, he noted that it was "parasitic upon the larva of *Pelopœus lunatus* Fab." Later on in the same work *(On the Hymenoptera of Cuba),* he lists *P. lunatus* as a synonym of *P. cæmentarius.* I have not seen any typical specimens of *Sceliphron cæmentarium* from Cuba, so Cresson probably considered *S. assimile* as that species.

The cocoon of *Acroricnus cubensis* is obconical, whitish or yellowish in color, fuzzy outside and smooth within. The meconium is excreted inside the cocoon and is therefore not a true stercoral plug. Sometimes a rudimentary cocoon is formed within that of the Sceliphron, indicating that these larvæ did not gain ascendency over their host until the resting period of its larva. In these examples, the rounded apex of the cocoon is somewhat below that of the host cocoon and attached to its wall. Between the apex and the conical posterior end which is attached in a similar way, there is no apparent indication of any cocoon spun by the parasite.

The dermestid beetles which I found in the nests of *Sceliphron assimile* were determined as Trogoderma sp. [A. G. Böving (larvæ), H. S. Barber (adults)]. The mature specimens are identical with a form reared by J. C. Bridwell from a package of seeds of Sophora stored at Brownsville, Texas, in 1921. Mr. Barber's note is interesting in this connection. "Several other forms of Trogoderma have been reared from cells of mud wasps about buildings and seem to reflect no other connection with these

nests than might be expected from the well-known food habits of larvæ of this genus. In the other cases, and probably also in the present instance, it is supposed they chanced to be attracted to the dried animal matter in unsuccessful cells, from a nearby infestation in other material. Attempts to identify the very numerous and usually misdetermined species of this ubiquitous genus have proven very unsatisfactory because a number of species infesting the personal or household effects of colonists or travelers have become established wherever conditions permitted survival, and have received an excessive number of names, associated with misleading or inadequate 'descriptions' to which have been added a great number of records under wrongly applied specific names."

Pachodynerus nasidens (Latr.) [J. Bequaert]

The nests of this vespid were found in the cells of *Sceliphron assimile.* It is apparently a true inquiline, using only the deserted cells of its host. It makes two or more cells out of each one of *assimile* by constructing thin, horizontal partitions of mud, and fills the cells with a species of lepidopterous larva belonging to the Pyraustinæ of the Pyralidæ [Carl Heinrich]. The egg is suspended by a delicate thread. There is no true cocoon, but the larva covers the walls of its cell with a shining, transparent, yellowish layer of silk, occasionally stretching this membrane across the corners.

Polistes incertus Cress. [J. Bequaert]

The entrance to Cienfuegos Bay is a narrow channel about three miles long, which gradually widens toward the sea. Near Punta de los Cocos on the western side, the shore is bordered by thickets of sea grape (Coccoloba), inhabited by the Giant Land Crab *(Cardisoma guanhumi* Latr.). Farther inland the sea grape is replaced by mixed second growth, in which I found a single nest of *Polistes incertus,* on September 3. The nest was hanging from a

twig about two meters above the ground. When I disturbed the wasps, they flew away, so I broke off the twig and found, upon examining the nest, that all the cells were empty. This fact probably accounts for the readiness with which the wasps took flight. Hoping they would return, I came back later in the afternoon; with better success than before, I captured a total of sixteen specimens.

In addition to these individuals (9 workers and 7 males), I collected two stray queens; one was taken at Castillo de Jagua on September 5, and the other at Limones Seboruco, Soledad, on September 15. The sexual dimorphism of the female sex is very marked, as may be seen in the following table, where the total length of the head, thorax, and first two tergites of the abdomen is given in millimeters:

Size	Males	Workers	Queens
Mm.	(Sept. 3)	(Sept. 3)	(Sept. 5 and 15)
7	1	—	—
7.5	6	—	—
8	—	2	—
8.5	—	6	—
9	—	1	—
9.5	—	—	—
10	—	—	—
10.5	—	—	—
11	—	—	1
11.5	—	—	—
12	—	—	1

Two of the above specimens were stylopized: one of the 7.5 mm. males had one parasite under the left side of the fifth tergite, and one of the 8.5 mm. workers had one parasite under the left side of the fourth tergite and one parasite under the right side of the fifth tergite.

The nest of *Polistes incertus* was previously unknown. The present example (see plate 1, figures 1 and 2) is fastened to the twig by a single attachment at the base of the uppermost cells. The comb hangs in a vertical plane, but

most of the cells are directed downward instead of being horizontal. The comb is irregular in outline, and somewhat curved so that the bases of the cells form a concave surface. The length of the comb is about seven centimeters, and the average width is less than four. There are 227 cells, about thirty of which are incomplete. Some of the cells in the middle of the comb are distinctly deeper than the others, and were probably occupied by the young queens. As previously noted, there were no larvæ or pupæ in the nest on September 3.

Polistes poeyi Lep. [J. Bequaert]

This Cuban wasp has been referred to in the literature as *P. minor,* but Dr. Bequaert tells me that, in his opinion, the true *P. minor* Beauv. does not occur in Cuba.

I collected 44 specimens of this species, most of which were taken at San José, where I also found a small nest on the under side of a large rock. I am not at all certain that the nest was built by *Polistes poeyi,* because the cells were empty and the comb apparently deserted. A female of this Polistes caught at San José on August 30, had captured a female trypetid fly, *Œdicarena tetanops* (Lw.), determined by Mr. Nathan Banks.

Polistes major Beauv. [J. Bequaert]

This species was nesting in exposed situations from three to six meters above the ground, on a cane lift near Arimao. The nests were attached to the under side of the steel girders by a single pedicel, and the combs were horizontal.

Two nests were secured, one on the sixth of September and another on the eleventh. The first was oblong in shape, about fourteen centimeters long, and nine wide. It contained 333 cells, but most of the peripheral cells had been recently constructed and were very shallow. The second nest was smaller and nearly round, with an average diameter of nine centimeters, and about 214 cells.

I captured 3 males and 20 females from the first nest, and 7 females from the second. I took the combs back

to the laboratory, and by September 17, 14 males and 18 females had emerged from the first nest, and 10 females from the second. Since the second nest was younger, only females were produced. No parasites were bred from either nest, though two of the males had mites on the sixth sternite. When I returned to the site of the first nest on September 11, the wasps which I failed to catch on my first visit were building a new comb.

Beside the specimens from the nests, I collected a single female of this species at San José in the Trinidad Mountains on August 30.

Polistes cubensis Lep. [J. Bequaert]

This is the commonest species of Polistes around Soledad. I collected five nests from the bat caves at Guabairo, and one on the eastern side of the entrance to Cienfuegos Bay. The latter nest (see plate 1, figure 3) was hanging from a small tree about two meters above the ground. It resembles the nest of *Polistes incertus,* which was found in a similar location, but is one decimeter long and contains 309 cells. The back of the comb is nearly flat, not concave. I captured 46 females from this nest on September 4, and 33 females and one male emerged before September 17. No parasites were bred from the nest, and none of the wasps were stylopized.

The nests from Guabairo were collected in sheltered places under limestone ledges in fairly thick woods. The one in plate 1, figure 4, is typical. The cells are intermediate in size between those of *Polistes major* and *P. incertus.* The back of the comb is concave, and the most recent cells form a sort of apron at the bottom. The base of the pedicel is a black, lichen-like attachment about a centimeter and a half in diameter. The following table will give an idea of the relative size and population of the five nests. The length of the comb is measured on the concave surface, but the width is measured in a straight line. The number of cells includes those which are unfinished.

Nests of *Polistes cubensis* from Guabairo, Central Soledad

	Nest No. 1	Nest No. 2	Nest No. 3	Nest No. 4	Nest No. 5
Length of comb in cms.	19.5	14.5	8.0	11.5	19.0
Width of comb in cms.	7.5	9.0	4.5	4.0	9.0
No. of cells	573	447	130	197	570
Date collected	Aug. 20	Aug. 20	Sept. 7	Sept. 7	Sept. 7
No. of wasps taken with nest	64 ♀ ♀	91 ♀ ♀, 9 ♂ ♂	Nest empty	? (all ♀ ♀)	? (all ♀ ♀)
No. of wasps which emerged before Sept. 17	80 ♀ ♀	3 ♀ ♀, 15 ♂ ♂	—	6 ♀ ♀	10 ♀ ♀, 18 ♂ ♂

It is interesting to note that nest No. 1 failed to produce any males, though it was probably the oldest nest. Five females from nest No. 1 and four males from nest No. 2 were stylopized. Each contained a single parasite as follows: 3 ♀ ♀ with a parasite under the right side of the third tergite, and 2 ♀ ♀ with a parasite under the left side of the third tergite; 2 ♂ ♂ with a parasite under the left side of the third tergite, one ♂ with a parasite under the right side of the third tergite, and one ♂ with a parasite under the left side of the third sternite. Two of the females from nests Nos. 4 and 5 (the wasps which I captured with these nests were not kept separate) had apparently been stylopized, and the parasites had emerged.

Nests Nos. 2, 4, and 5 were parasitized by *Polistiphaga fulvescens* (Cress.) [R. A. Cushman], originally described in the genus Mesostenus. One specimen emerged from nest No. 2 on August 21, and on September 16 two specimens emerged from nest No. 4, and seven specimens from nest No. 5. *Polistiphaga fulva* (Cress.) [J. Bequaert], a North American species of this genus, is parasitic on *Polistes fuscatus* (Fabr.) var. *pallipes* (Lep.) [J. Bequaert]. When collecting a nest of this wasp at Cold Spring Harbor, Long Island, New York, on September 6, 1929, I caught a single female of the parasite. Another

1

2

3

4

Dow—Cuban Wasps

female emerged on the same day, and a third female on the 7th; two males emerged on the 8th. All five specimens apparently developed from a single larva of the Polistes.

Explanation of Plate 1.

Fig. 1. Nest of *Polistes incertus* Cress., from Punta de los Cocos, Cienfuegos, Cuba.

Fig. 2. The same, showing back of comb.

Fig. 3. Nest of *Polistes cubensis* Lep., from Punta Pasa Caballo, Cienfuegos.

Fig. 4. Nest of *Polistes cubensis* Lep., from Guabairo, Central Soledad, Cienfuegos.

A NEW SPECIES OF DICÆLUS FROM SOUTHERN FLORIDA

By H. C. Fall

Tyngsboro, Mass.

Dicaelus darlingtoni n. sp.

Size, form and general aspect similar to *purpuratus*. Form oblong, moderately elongate; body beneath and head black, prothorax and elytra with deep purpureo-violaceous lustre, becoming rarely slightly bluish, opaque. Head variable in size, the difference being largely sexual in nature; in several measured examples of each sex the ratio of its width to that of the thorax being about .67 in the female and .63 to .64 in the male.

Prothorax about three-fifths as long on the median line as the maximum width; sides convergent apically, typically perceptibly sinuate behind the middle, but varying to continuously arcuate and subparallel posteriorly, the base an-

gles rectangular with rounded vertices; thickened side margins slightly wider and better defined than in *purpuratus*.

Elytral intervals distinctly alternating in convexity, the summits of the more convex intervals narrowly blackish and slightly shining. In *purpuratus* the discal intervals are of uniform convexity; the seventh is cariniform in both species.

Length 22 to 25 mm.; width 9 to 10 mm.

A good series of specimens is before me, all taken at Homestead, Florida, in June 1928 and '29 by Mr. P. S. Darlington, Jr., to whom I take pleasure in dedicating the species. The type, a ♀ , and several paratypes remain in my own collection, several paratypes also in Mr. Darlington's collection.

Although most nearly like *purpuratus* in general facies, in the character of the elytral intervals this species agrees more nearly with *quadratus*, to which it would be traced in Horn's table of the genus (Bull. Brook. Ent. Soc. 1880, p. 51). *Quadratus* is however an evidently more robust species, the prothorax relatively larger with sides more nearly continuous with those of the elytra, giving a distinctly more oval outline. In the few specimens seen the violaceous surface tint is less developed than in *darlingtoni*.

The tendency toward a greater development of the head in the female is also observable in my series of *D. splendidus*, and suggests that Casey's *D. speciosus*, said to closely resemble *splendidus* except for its smaller head, is really that species. The fact that Casey's specimens were all males is confirmative evidence.

NEW SPECIES OF CRYPTOCEPHALUS
(Coleoptera; Chrysomelidæ)

By H. C. Fall
Tyngsboro, Mass.

Cryptocephalus pallidicinctus n. sp.

Moderately robust. Head black, a quadrate post-clypeal area, a small spot posteriorly adjacent thereto, and the entire inner border of the eyes narrowly whitish yellow. Antennæ black.

Prothorax orange red, the extreme apical edge pale yellow, the basal edge very narrowly blackish; surface sparsely feebly and very finely punctate.

Elytra black, with narrow whitish yellow basal and lateral margin which at apex does not quite reach the sutural angle; striae moderately impressed, nearly as in *sanguinicollis,* the sutural not reaching the middle of the elytra, 6th very widely interrupted medially, 7th dislocated at basal third.

Entire upper surface polished and strongly shining. Pygidium coarsely punctate, obtusely carinate at middle in basal third. Body beneath black; prosternum whitish yellow, with moderate cuspiform lobe in front, the hind angles with erect spiniform processes tipped with black.

Length 4 mm.; width 2.3 mm.

Palm Springs, California, 3-22-17. A single male.

This species is nearly related structurally to *sanguinicollis,* but differently colored. It differs further in its more distinctly impressed elytral striae, carinate pygidium, and smoother elytral interspaces, which show scarcely a trace of the fine transverse regulosity usually evident in *sanguinicollis.*

Cryptocephalus apicedens n. sp.

Pale yellow with fuscous stripes, the darker color predominating. Antennæ pale at base, infuscate externally. Head yellow with a fuscous inverted V, the branches terminating inferiorly at the bases of the antennæ.

Prothorax with four broad fuscous stripes leaving a narrow sharply defined median line, a very narrow anterior margin, wider lateral margins, and two somewhat oblique basal spots which are produced imperfectly to the front margin, yellow.

Elytra with the suture dark except at base, and each with three fuscous stripes, the two outer in great part confluent. The yellow stripes occupy the 2nd, 4th and marginal interspaces, the two former abbreviated at apex. There is also a short humeral dash between the 5th and 6th striae, and an obscure subapical streak between the 6th and 7th striæ. The striæ themselves are regular except the 5th, which is confused behind the middle, and the 6th which is interrupted medially.

The entire upper surface is highly polished, the thorax with very sparse minute punctures, the elytra without trace of interstitial punctures. Prosternum behind broadly emarginate with prominent elevated lateral angles; apical margin obtusely prominent at middle, behind which is a short erect and acute spiniform tooth (♂).

Length 3 mm.; width 1.7 mm.

Described from a single male taken at Jemez Springs, New Mexico, VI-8-22.

This little species seems most nearly related to *confluens* but the several differences, though in part rather trifling, are in the aggregate I think sufficient to forbid its association with that species. These differences are as follows. The form is less parallel in the present species, the elytra distinctly narrowing from base to apex; eyes less widely separated above; instead of the inverted V of the present species the front in all examples of *confluens* seen is marked with a short median line on the vertex; the 5th elytral stria is quite regular in *confluens* and the

6th is represented as a rule by only two or three punctures just behind the humeral callus; the size in *confluens* is consistently larger; finally and probably most important, the acute lobe or cusp formed by the production of the apical margin of the prosternum in the male of *confluens* and allied species is here replaced by an isolated spiniform tooth posterior to the true margin, which latter is only moderately angularly advanced at middle.

Cryptocephalus merus n. sp.

Moderately stout, subparallel, yellow, highly polished, with brown or reddish brown markings as follows. Head with the usual small vertex and supra-antennal spots; prothorax with four more or less irregular or disintegrated vittae, the two inner ones separated by a narrow sharply defined yellow line; elytra with brown striæ, an elongate spot between striæ 2-3 at base, a similar spot at the apical third between striæ 4-5, behind this another more diffuse, the humeral umbo, and two small spots at basal and apical thirds on the subhumeral interspace. Striæ 5-7 are independent for a short distance at base but become interrupted and partially lost posteriorly.

Head sparsely finely punctate; prothorax with sparse irregularly scattered rather coarse punctures; elytral striæ moderately impressed.

Body beneath yellow with close set punctures, metasternum, and ventral segments in part, brown. Prosternum in front with apically rounded not very prominent lobe; behind emarginate and bilobed as usual.

Length 4 mm.; width 2.3 mm.

El Paso, Texas. Type ♀.

This species is not closely similar to any known to me. In a general way at long range the elytral markings somewhat resemble those of *spurcus,* and for the present it may be placed near the latter. The very sparsely irregularly and rather coarsely punctate thorax has no parallel in any of our previously described species, but occurs again in the following species, which may indeed be no more than a variant form of the present one.

Since writing the above I have received from Mr. D. K. Duncan two examples from "Base of Pinal Mts., Arizona," which are quite surely specifically identical with my El Paso type. They differ only in having the dark shades on the pronotum almost washed out and those of the elytra completely so.

Cryptocephalus cuneatus n. sp.

Moderately robust, elytra distinctly narrowed from base to apex; color pale yellow; prothorax with three rather wide light brown vittæ which do not quite attain the apex; elytra with a narrow common sutural vitta and another scarcely wider from the humeral callus slightly abbreviated at apex, deep black. Antennæ pale at base, infuscate apically.

Head finely sparsely punctate, a narrow vertex line and a spot at base of antennæ light brown.

Prothorax shining, sparsely lightly and very finely punctate, the interstices between the punctures thickly set with very minute punctules. The brown vittæ are subequal in width to the intervening yellow ones; lateral margins finely edged with black except near the base.

Elytra with similar ground sculpture of micro punctulation and with eight discal striæ between the short sutural and the marginal stria, the sixth however imperfect and contained wholly within the lateral black vitta. The basal two punctures of the fourth discal stria are joined by a dark line. Epipleura blackish posteriorly, and externally so toward the base.

Body beneath and legs pale. Prosternum slightly prominent at apex, feebly carinate along the middle, narrowly emarginate and obtusely bilobed behind.

Length 3.4 mm.; width 2 mm.

Tybee Island, Georgia. A single male collected and sent me by the late G. R. Pilate.

This very pretty little species bears an obvious resemblance in size, form and pronotal markings to *trivittatus*, which, however, differs by its much more coarsely and closely punctate thorax, which because of a very fine alutaceous ground sculpture in addition to the micro-punc-

tulation above referred to, is more or less dull in lustre. The elytral vittæ in *trivittatus* are brown instead of black and much less even and clear cut, the lateral ones always more or less disrupted and displaced posteriorly where it extends inward to the fourth stria.

Cryptocephalus ochraceus n. sp.

Upper surface of a nearly uniform deep yellow tint; head with a short vertex line and the bases of the antennæ reddish brown; prothorax with a feeble narrow basal line and faint traces of sublateral shades; elytra with the strial punctures, the sutural edge and an ill defined fascia just before the apex of the same color. Antennæ pale basally, outer joints brownish.

Head sparsely punctate; thorax strongly and conspicuously so, the punctures in great part tinged with reddish brown and separated on the average by about their own diameters; surface moderately shining.

Elytra a little duller in lustre though without perceptible alutaceous sculpture. Striæ not much impressed, the sutural reaching the basal third, discal striæ 1-5, 8, and 9 quite regular, 6th and 7th regular for a short distance behind the humeral callus but much confused beyond that point. Intervals with a single series of widely spaced extremely minute punctures.

Body beneath suffused with reddish brown, tibiæ, tarsi and apical half of femora of same color, basal half of femora yellow. Prosternum not distinctly lobed in front, rather deeply emarginate with prominent angles behind.

Length 4.4 mm., width 2.5 mm.

Dunedin, Florida, IV-5-22: a single female specimen collected by the writer.

This species in size and color somewhat resembles *umbonatus* Schf. but in the latter the striæ are much deeper and the thorax very much more finely punctate. In its relatively coarsely punctate thorax *ochraceus* approaches the species at the end of LeConte's table, more especially *tinctus*, before which and *schreibersi* I would suggest it be placed.

AN EFFECTIVE METHOD FOR COLLECTING ECTOPARASITES FROM LIVE ANIMALS AND BIRDS

By Lawrence H. Dunn

Medical Entomologist and Assistant Director, The Gorgas Memorial Laboratory, Panama, R. de P.

The following method for collecting ectoparasites from live animals and birds that has now been used for some time by the writer has proved to be very effective and it is believed that a published description of it may be of interest to parasitologists, entomologists and others that are sometimes engaged in collecting ectoparasites.

This method was first tried out in securing specimens of fleas from a young peccary, or wild pig, *Pecari angulatus bangsi* Goldman. This animal, which apparently was between two and three months of age and weighed about seven pounds, had recently been captured by men engaged in the construction of a new road in the Canal Zone. Through the kindness of Mr. Louis Hulcher, Foreman on the road work, the peccary was brought to this laboratory in order that it might be examined for blood parasites and also to provide an opportunity for collecting specimens of the fleas with which it was heavily infested.

This animal had been quite gentle and was kept as a pet at the camp of the road builders where it had lived for a number of days. On arrival at the laboratory it seemed to be frightened by the strange surroundings and strongly resisted being handled. The vigorous struggles of the pig and the activity of the fleas formed a combination which made the capture of many specimens rather a difficult task. It was evident that unless some method was devised for collecting the fleas, other than by using fingers or forceps or inverting glass tubes over them, our catch was not likely to be a very large one. In view of this, the following procedure was tried out. A narrow strip of adhesive tape wound several times around the snout and under the lower jaw of the pig acted as a muzzle and effectually pre-

vented it from biting. The forefeet were tightly fastened together with a piece of one-inch bandage and after the hind feet had been secured in like manner a short strip of the bandage was used to connect the fore and hind feet. This strip was about eight inches in length and prevented the forefeet from being separated from the hind feet for a distance of more than its length. This permitted some movements of the legs but prevented the animal from using them too freely. The pig was then placed in a sitting position in a large glass anatomical jar with its head above the top of the jar and a towel placed about its neck somewhat after the manner in which a barber's apron is used. This left one side of the towel wrapped tightly about the neck of the pig while the other part was spread out to completely cover the top of the jar. An elastic band stretched around the top of the jar and the outer edge of the towel served to hold the latter closely in place. As the animal rested on its hind feet the bandage connecting them with the forefeet held the latter down in the jar and prevented them from being hooked over the top of the jar or to claw at the towel. One hand grasping the towel at the nape of the neck of the pig sufficed to hold the animal upright with its head above the top of the jar as well as to keep the towel tightly in place about its neck. Chloroform was then liberally sprinkled about on the towel in rather close proximity to the pig's neck but not near enough to permit the liquid to reach the animal's body. The vapor of the chloroform being heavier than air readily penetrated through the towel to the bottom of the jar. The effect of the chloroform vapor on the fleas quickly became evident and in less than a minute many of them were seen leaving the pig and falling to the bottom of the jar. A few that came up on the head of the animal were stupefied and were collected by dabbing them with a small pledget of cotton wet with chloroform. In about four minutes the pig was taken from the jar and after removing the towel from about its neck the animal was given a brief combing to remove the few dead or stupefied fleas that were adherent to the hair or skin. A careful examination of the animal

was then made and it seemed to be entirely free from the fleas.

It was very easy to collect the dead and stupefied fleas from the bottom of the jar. Inverting the jar over a piece of white paper caused the greater number of them to fall on the paper from which they were transferred to tubes of alcohol. The few that remained sticking to the inside of the jar were easily picked up on the side of a dissecting needle wet with alcohol.

A total of 148 fleas were collected from the peccary at this time and although the animal was kept at the laboratory for several weeks and was examined at frequent intervals no more fleas were ever found on it.

A short time later there was an occasion to examine a number of marmosets, or squirrel monkeys, *Leontocebus geoffroyi* (Pucheran), for possible ectoparasites before placing them in the animal house at this laboratory. These animals had been recently captured and being vicious biters were difficult to handle in so far as examining them closely for ectoparasites was concerned. Since they were hardly larger than a squirrel and it was necessary to hold them tightly in gloved hands in order to prevent biting, there was but little of an animal's body left exposed for examination. By using the chloroform-jar-method the examination of these monkeys was simplified to a great extent and it was quite surprising to find so many of them infested with fleas. Although the short snout of this species of monkey precluded using adhesive tape as a muzzle the towel and skin when held together at the nape of the neck prevented them from turning to bite or moving to any great extent. When this method is used on animals having prehensile tails, such as monkeys, opossums, etc., the tail is usually fastened to the hind feet in order to keep it away from the top of the jar.

A black spider monkey, *Ateles dariensis* Goldman, that was found to be heavily infested with lice was treated with this chloroform vapor method and *Pediculus* to an estimated number of from 4000 to 6000 were obtained.

Numerous opossums, *Didelphis marsupialis etensis* Al-

len, have been cleared of fleas with this method and it was also found to be very successful when tried out on Coatis, *Nasua narica panamensis* Allen, and grisons, *Grison canaster* (Nelson), many fleas and lice being obtained from these animals.

When treating animals that have long thick hair or fur after taking them from the jar it is necessary to rub the hair briskly with the fingers or use a comb in order to remove the inert fleas or lice that remain clinging to the hairs.

This method is easily applied to birds and has proved to be very effective in clearing them of lice. The wings are brought up over the back and fastened together with two or three turns of a narrow bandage that is drawn up between the feathers close to the wing. The feet are tied together with a piece of string or with a rubber band or they may be left free to allow the vapor more freely to reach the area between the thighs. After removing the bird from the jar it is held over a large piece of white paper and its feathers vigorously ruffled and drawn upward with the fingers to cause the stupefied lice to fall clear of the feathers. A tinamou, *Tinamus major castaneiceps* Salvadori, when treated in this way recently yielded 603 lice, representing three genera, *Conoides, Ornicholax* and *Kelloggia.* A total of 176 lice, 122 *Columbicola* and 54 *Goniocotes,* were obtained from a domestic pigeon.

This method is now being used as a routine measure on all animals and birds received at this laboratory. The ease with which abundant yields of ectoparasites are obtained by its use leads me to believe that it may be extremely useful if used on a larger scale in clearing domestic fowls, dogs, etc., of fleas, lice and mites. Investigations on its application along more practical lines will be carried out in the future.

The specimens of ectoparasites are in good condition and in much better shape to be studied when collected by this method and are seldom found partly crushed or with many spines or hairs broken off as so frequently occurs when collected with forceps or fingers.

THE THATCHING ANT, *FORMICA OBSCURIPES* FOREL

By A. C. Cole, Jr.
Ohio State University

Formica obscuripes is apparently one of the most successful ants present in semi-arid regions of the West. Its mounds, composed of dried plant material, are successfully able to resist the strong, westerly winds common to that section of the United States.

Wheeler[1] records this species from Wyoming, Montana, Colorado, Arizona and British Columbia. In addition to these localities I have found it in Idaho, Oregon and South Dakota. Wheeler[1] states that colonies of *obscuripes* are most abundant at higher altitudes, from 5,000 to 8,000 feet. Furthermore, the mounds are apparently most abundant in semi-arid localities, especially where sagebrush and its allied flora are growing.

The mounds consistently are composed of twigs and other dry plant material and are more or less dome-shaped (fig. 1). Almost invariably they are centered around a dead sagebrush plant. Parallel with the stem of the sagebrush one or more galleries extend into the interior of the mound. At least one of these external orifices opens at the apical juncture of the mound with the sagebrush stem. Other entrances perforate the mound in widespread places. I have counted as many as 44 and as few as 3 entrances on a single mound.

From observations it is certain that the sagebrush is alive when the ants begin building the mound. When the colony possesses a suitable number of workers the bark is chewed from the base of the plant and formic acid is ejected on the tender cambium layer. Whether this formic

acid is required for the destruction of the plant is questionable but it is doubtful whether elimination could be completely accomplished without it. After the plant has been killed it dries and the branches are broken off and disseminated by the wind. This operation takes place very slowly, it requiring sometimes as long as three months for the plant to be entirely eliminated. One can often observe mounds in which the stems have been broken off flush with the apex of the mound. In such cases the operation of destruction is incomplete for eventually the entire

Fig. 1. Typical mound of *Formica obscuripes* composed of wheat straw. Twin Falls, Idaho.

stem is removed. When the operation is complete the center of the mound will be found to possess a large longitudinal gallery, apparently the main entrance to the interior of the mound.

The main brood chambers are located approximately three feet lower than the base of the mound proper, but auxilliary chambers are scattered throughout the remainder of the nest where the brood may be moved upon

the occurrence of temperature fluctuations. (fig. 2). In most cases the brood is isolated in separate chambers according to age but often it is intermingled in the same chambers.

The twigs and grasses which comprise the external architecture also extend into the ground for a distance of from several inches to a foot and rest on a crateriform base. Perhaps this provides anchorage for the mound or even aeration of the brood. The slight precipitation occurring

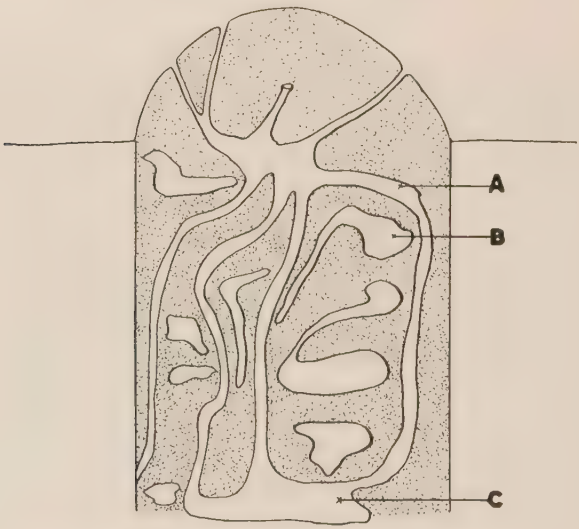


Fig. 2. Diagrammatic longitudinal section of a mound of *F. obscuripes*. Twin Falls, Idaho. A, a main gallery; B, auxiliary chamber; C, main brood chamber.

in the West has little effect on the mounds and there is no great danger of the crateriform base filling up with water.

Colonies of *obscuripes* are always quite populous and include both major and minor workers. Both of these aid in the protection of the colony, ejecting formic acid at the slightest unnatural disturbance. The macrogynous queens in a single colony vary in number, there always being two

or more present. Winged males and females appear in large numbers during June and July.

These ants feed chiefly on dead insects and related forms which they usually place in the brood chambers. Occasionally, however, they carry seeds into the mounds. Whether these seeds are used for food is evidently unknown. In a few mounds I observed them intermingled with the brood as is the case with the above food.

Wheeler states[2] that he has observed whole colonies of *obscuripes* attending droves of young Membracids in Colorado. I, too, have observed this association in Idaho and have also seen the ants attending two species of undetermined aphids on sagebrush. Wheeler[2] lists *Euphoria inda* and *hirtipes* as among the synœketes of *obscuripes*.

LITERATURE CITED

[1] Wheeler, W. M. A revision of the ants of the genus Formica (Linne) Mayr. Bull. Am. Mus. Nat. Hist., Vol. 53, No. 10. (1913)

[2] Wheeler, W. M. Ants; their structure, development and behavior. Columbia Univ. Press. (1926).

TWO BRIEF HISTORICAL NOTES

By J. G. Myers
Imperial College of Tropical Agriculture, Trinidad, B. W. I.

I. The Oldest Work on Insect Anatomy

In the first volume of Bodenheimer's monumental history of entomology appears the following statement (p. 327): "Als das älteste Werk anatomischer Insekten-Betrachtung gilt das Apiarium des römischen Arztes Francesco Stelluti (1625)."

Bodenheimer seems entirely to have overlooked the great anatomist, Giulio Casserio (Casserius), the successor of Fabricius ab Aquapendente in the Chair of Anatomy and Physics at Padua.

Although, so far as we know, Casserius published no *separate* works on insect anatomy, yet his descriptions and dissections of cicada anatomy, printed in 1600, are so excellent and faithful that it seems to us that his distinction as the first insect anatomist is indisputable. Several accounts of cicada structure appearing in the present century have been less accurate. The general treatise in which his studies are buried is entitled: *De vocis auditusque organis historia anatomice singulari fide methode ac industria concinnata tractatibus duobus explicata ac variis iconibus aere excusis.* (Ferrara, F. 2 tractatus in 1 vol. Tab. I-XXII et I-XII).

II. Zooprophylaxis for Mosquitoes

In view of the present emphasis placed by Roubaud and other workers on the protection from Anophelines, said to be afforded to man by the vicinity of domestic animals in large numbers, it is interesting to notice that Humboldt was apparently the first to remark on this and to describe an instance in which the theory was deliberately put into practice. In his "Personal Narrative" (Ross trans., 1852, vol. II, p. 280) he says, "In the villages of the Rio Magdalena the Indians often invited us to stretch ourselves as they did on ox-skins, near the church, in the middle of the *plaza grande,* where they had had assembled all the cows in the neighborhood. The proximity of cattle gives some repose to man."

A FEMALE INTERMEDIATE BETWEEN *PAPILIO GLAUCUS* AND ITS FORM *TURNUS* (LEPID.: PAPILIONIDÆ)

By Harold O'Byrne
Webster Groves, Missouri

It is well known that there are two forms of female in *Papilio glaucus* Linn., the black type form and the yellow form *turnus* Linn., and that they are not only sexual forms, but geographical as well. In the southern part of the range of this species, black females are the rule, while in the north, only yellow ones occur; in a considerable region near the middle of its territory, both forms fly together. Missouri is in that intermediate region, though collectors in the neighborhood of St. Louis consider the yellow form somewhat scarce. The males are invariably yellow, and a few closely related species that inhabit the southwestern part of the country and northern Mexico are never black in either sex. To the knowledge of the writer, no breeding has been done in this species with a view toward working out the relations of these forms in the light of genetics. The fact that this condition is linked with sex, and that according to Jordan[1] there is a rarity of intermediate forms, indicates that this is a Mendelian phenomenon.

Knowing of the rarity of intermediate forms, I was surprised to take at Allenton, Missouri, on August 9, 1931, such a female, having the black color of *glaucus*, but heavily suffused with yellow on the upper and lower surfaces of both pairs of wings. This has the effect of making the black stripes very noticeable on the upper side, and in this respect the specimen differs markedly from *glaucus*. This specimen is in no wise comparable to one mentioned by

[1] In Seitz, *The Macrolepidoptera of the World.*

Scudder[2] in which one pair of wings is yellow and the other black. He describes this as a hermaphrodite—really a gynandromorph—while the specimen from Allenton is a normal female with the normal female coloration of both forms and with her abdomen distended with eggs.

Knowing nothing of its antecedents, it is idle to speculate as to the genetic status of this specimen. It probably represents a case of imperfect dominance, but whether this appeared as a mutation is, of course, impossible to say. There is a valuable problem for geneticists.

DENDROIDES CANADENSIS LATREILLE—SYNONYMY

By H. S. Barber

U. S. National Museum, Washington, D. C.

Those rejecting the adoption in LeConte 1855 of *Dendroides canadensis* Latreille 1810 with *bicolor* Newman 1837 in synonymy as the proper name of our commonest Pyrochroid beetle probably did not realize that Latreille's designation (p. 430) of the type species for his monobasic genus erected in the same work (p. 212) connected his new specific name, *canadensis*, with the diagnosis, thereby making LeConte's use of the name the only proper choice under the International Code of Nomenclature. The misstatements in Lacordaire 1859 evidently led to the synonymy wrongly adopted in Gemminger and Harold 1870, this synonymy being followed by European workers and accepted in Leng 1920. The current synonymy should be reversed and we should go back to the usage reflected in the catalogues by Melsheimer 1853, LeConte 1866, Crotch 1874, and Henshaw 1885, as well as in numerous more local lists prior to 1920. In the admirably brief but important statement by Miss Payne 1931, recording her six years' observations on larvæ which could not pupate except as stimulated by a particular food, her use of the name

[2] Scudder, S. H. *The Butterflies of the Eastern United States.*

canadensis seems to have fortunately been passed over without being standardized into conformity with the last catalogue.

In the following list of works consulted, the asterisk indicates use of the valid prior name (*canadensis* Latreille 1810) instead of its synonym (*bicolor* Newman 1837).

*1810 Latreille, Consid. General.—Crust. Arach. Ins. Paris, p. 212, 430.
*1825 Lepeletier & Serville, Encyl. meth., Ins., vol. 10, p. 169, 261.
1837 Newman, Ent. Mag., vol. 5, p. 375.
*1853 Melsheimer, Cat. Coleop. U. S., p. 148.
*1855 LeConte, Proc. Acad. Nat. Sci. Phila., vol. 7, p. 275.
1859 Lacordaire, Gen. Coleop., vol. 5, p. 603, footnote 3.
*1866 LeConte, List Coleop. N. A., p. 64.
1870 Gemminger & Harold, Cat. Coleop., p. 2104.
*1874 Crotch, Check List Coleop. Am. N. of Mex., p. 109.
*1885 Henshaw, List Coleop. Am. N. of Mex., p. 129.
1914 Blair, Ann. Mag. Nat. Hist., Ser. 8, vol. 13, p. 313.
1920 Leng, Cat. Coleop. Am. N. of Mex., p. 161.
1928 Blair, Coleop, Cat., Junk, pt. 99, Pyrochroidæ, p. 2.
*1931 Payne, Ent. News, vol. 42, p. 13-15.

A WIREWORM DOUBLE MONSTER (*LIMONIUS CANUS* LEC., ELATERIDÆ, COLEOPTERA)

By Chas. E. Woodworth
Associate Entomologist, Division of Truck Crop Insects, U. S. Bureau of Entomology

Quite recently it was my good fortune to find and preserve an interesting monstrosity among some newly hatched wireworm larvæ. In the course of examining about eighteen thousand of these, only one abnormal individual was noted. Besides the great scarcity of anomalies in this group the fact that wireworms are of subterranean

Fig. 1. Partial twin, first instar larval wireworm. *Limonius canus* Lec., ventral aspect, actual length 2 mm. Enlarged 60 diameters.

habits makes observation rare indeed. For these reasons it was decided to report this case. In order to insure that this partial twin should not be lost it was killed and fixed as soon as discovered and, as a consequence, growth records were not obtained. It is hoped that another individual will be found so that developmental changes can be noted.

The specific type of anomaly possessed by the individual here reported is classified by Cappe de Baillon[2] as a symmetrical double monster with lateral abdominal doubling. This particular diplopagisity, according to Wilder[3], is believed to be due to wide separation of some of the segmentation nuclei in early embryonic development, perhaps being traceable to the two-cell stage. Had there been complete wide separation there would have been identical twins. In phasmid larvæ Cappe de Baillon found that abdominal doubling was very rare as compared to cephalic or thoracic doubling. In fact very few larval irregularities of any type have been reported. In adults abdominal monstrosities are very rare as compared with other types. This fact is strikingly noticed when the literature of reported cases is reviewed.

This particular larva has a perfectly formed head and thorax as well as the first five abdominal segments as far as external study indicates. The sixth segment is irregular in shape, being double at the bottom but single at the top. The last three segments are apparently normal but duplicated. The digestive tract appears to be double throughout the sixth segment and divides at the junction of the fifth and sixth segments, the irregularity beginning about the middle of the fifth. The fat bodies, the only other internal structures visible, seem to conform to the external arrangement. The length of the larva is the same as the rest of the worms from the same mating if either of the tails are used. The volume would be the same if the duplicated parts were removed and the sixth segment trimmed to normal shape. There does not seem to be any atrophy or hypertrophy except as noted above and each duplicated segment is like the corresponding somite of the other half

and of other larvæ from the same mating except the abdominal segment 6.

In 1927 Cappe de Baillon wrote a very excellent book which concerned itself entirely with teratology or monstrosities found in insects. While the principle part of the work deals with a study of *Carausius morosus* Brunner, a phasmid, one that is very prone to irregular development, there is included a 382-title bibliography. Practically all of these references refer to adult irregularities, probably because those forms are the ones found in collections. Most of these malformations take place in the pupal reorganization. How much larger the list would be if larval anomalies such as the one here reported were more often found! In this whole list of references only one deals with elaterids. That one is by Bastine[1] and concerns itself with an antennal irregularity in an adult of *Melanotus rufipes* Herbst in which the second antennal article had two extra growths upon it.

Literature Cited

[1] Bastine, F.
1910 Cas de Monstruosite chez un *Elateridæ* du genre *Melanotus Escholtz.* Feuille des Jeun. Nat. 40:147.

[2] Cappe de Baillon, P.
1927 Recherches sur la Tératologie des Insectes. Paris, 291 pages, fig. 85, pl. 9, ref. 382.

[3] Wilder, H. W.
1904 Duplicate Twins and Double Monsters. Amer. Jour. Anat. 3: 387-493, fig. 11, pl. 2, ref. 151.

TWO NEW SPECIES OF EAST AFRICAN CLERIDÆ (COLEOPTERA)

By A. B. Wolcott
Chicago, Illinois

Gyponyx pertenuis sp. nov.

Elongate, black, shining, sparsely clothed with long yellowish white pile; antennæ rufo-piceous, five terminal segments darker; labial palpi fulvous; maxillary palpi piceous; elytra black, scutellar area rufous, a median and a subapical fascia white; abdomen black, posterior margin of fifth sternite pale flavous; middle of ultimate sternite rufous.

Head longitudinally rugose; front irregularly coarsely punctate; occiput more closely punctate; labrum provided with a tuft of long yellow hairs at each side. Prothorax slightly longer than wide; sides feebly rounded, rugose and rather densely punctate; base much narrower than apex; subapical transverse impressed line sinuous, distinct; disk with a transverse sulcus before the middle and a longitudinal depression extending from subapical line to behind the middle, this depressed area rugulose and rather coarsely, deeply punctate, elsewhere very finely and distantly punctate. Elytra wider at base than prothorax in any part; humeri obtusely rounded; sides parallel; apices conjointly rounded; basal half coarsely deeply seriately punctate, with numerous irregularly distributed smooth elevated small transverse pale yellow spots; apical half to subapical fascia finely, remotely, shallowly but seriately punctate; apex finely, confusedly punctate; postscutellar area depressed; second interspace expanded and bearing a rather elongate but not prominent tubercle at base; sutural margin in apical half broadly sulcate, the sulcus limited externally by a fine carina; median fascia moderately wide, anteriorly convex, narrowest at sides, its margins somewhat irregular; subapical fascia transverse, slightly wider at flanks than at suture; both fasciæ free from lateral and sutural bead. Pro- and mesosternum black,

coarsely, closely punctate; metasternum black, rather finely, sparsely, shallowly punctate. Abdomen moderately coarsely, sparsely, feebly punctate. Legs coarsely, closely punctate. Length 13.5 mm.; width (greatest) 3.4 mm.

Type locality—Kigonzera, Lake Nyassa, Tanganyika Territory.

Type, a male, in collection of the author.

Allied to *G. signifer* Boheman, but differing from that, as well as from the other described species, by the presence of the two very distinct white fasciæ, and by the raised yellow maculations of the basal portion of the elytra. The new species is more elongate in form than is Boheman's species, but agrees very well in this respect with *G. angustus* Schenkling, from which, however, it is distinct in sculpture and in coloration.

The impressed lines or sulci of the pronotum serve to throw into more prominent relief a pair of tubercles each side of the middle, there is also a less conspicuous tubercle at middle before the anterior pair and another similar one at middle behind the posterior pair.

Gyponyx hintzi nom. nov.

E. Hintz (Deutsche Ent. Zeitschr., 1897, p. 287) described as new a species of Cleridae from Usambara, to which he gave the name *Aphelochroa rufa;* Sigm. Schenkling in 1910 (Col. Catal., Cleridae, p. 43) placed this species in *Aphelochroa,* but later on (Entom. Mitteil., IV, 1915, p. 248) he referred it to the genus *Gyponyx* Gorham, retaining the specific name *rufus.*

Hintz in 1902 (Deutsche Ent. Zeitschr., p. 178) described another species from Usambara under the name *Stenocylidrus rufus:* The species was recorded under the same name by Schenkling in 1910 (Col. Catal., Cleridae, p. 18); the same author (Trans. Linn. Soc. Lond., 1922, p. 325, note), transferred this species to the genus *Gyponyx.*

As a result of the fact that both of the species described by Hintz are now known to belong to the genus *Gyponyx,* the *G. rufus* (Hintz) of 1902 becomes a homonym of the species described by Hintz in 1897, and a new specific

name is rendered necessary for the *G. rufus* of 1902, and for this the name *hintzi* is here proposed.

Stigmatium mucronatum sp. nov.

Black; prothorax and nearly basal fourth of elytra sanguineous, the former having the apical margin broadly black, and the disk with three very obscure vittæ dark; feebly shining; elytra with an antemedian fascia-like maculation composed of shining silvery white pilosity extending from the lateral margin to the third interspace, and a slightly narrower fascia composed of yellowish gray pile at apical fourth.

Head black, finely and sparsely punctate; the epistomal region coarsely and closely punctate; the front, and the anterior and inferior margin of the eyes clothed with long white hairs, which become very short and inconspicuous on the occiput, where there are also a few long erect black hairs. Antennæ black, eleven segmented; first segment stout, curved; second small, subglobular; third elongate, feebly wider toward its apex, nearly equal in length to fourth and fifth together; fourth rather slender, nearly twice as long as wide at its apex; fifth slightly shorter than fourth, subtriangular; sixth much wider than fifth, its width equal to its length; seventh to tenth slightly shorter but equal in width to sixth, each segment wider than long and truncate at apex, the sides rounded to base; eleventh slightly narrower but one-half longer than tenth, scarcely cultriform, segments six to eleven forming a somewhat depressed, rather compact club. Prothorax one-fourth wider than long; surface remotely and finely punctate, the apical portion feebly wrinkled and rather coarsely, closely punctate; anterior transverse impressed line distinct, a small well-impressed fovea each side; sides broadly and rather feebly rounded; basal impressed line distinct; flanks and red discal area densely clothed with very short yellowish pubescence, with a rather sparse admixture of long semi-erect black hairs. Elytra wider at base than the prothorax, basal portion rather depressed, behind the middle of the length convex; sides very feebly sinuate to be-

hind the middle, thence gradually narrowing to the mucronate apices, the suture dehiscent; scutellar region scarcely depressed. Each elytron with ten rows of striate punctures, the punctures in about basal half coarse, deep and rasp-like; the four lateral striæ are deep and distinct to the subapical fascia, below the antemedian maculation being coarsely, but simply punctate; in apical half the discal striæ are very fine, finely closely punctate, and of the same extent as the lateral rows; the apices posterior to the subapical fascia are finely irregularly rugose, closely and densely punctate, the punctures variable from large to small, and feebly impressed; in the basal half the first five interspaces bear setigerous pustules, and the second interval has a large prominent tubercle near base. Underparts and legs black, moderately clothed with long whitish hairs, those of the abdomen much shorter; the metasternum in large part densely clothed with depressed white hairs. Length 11 mm.; width 3.3 mm.

Type locality—Kigonzera, Lake Nyassa, Tanganyika Territory.

Type, a male, in collection of the author.

This species seems best assigned to the subgenus *Oxystigmatium* Kraatz. The structure of the antennæ is, however, so entirely different from that of any species of *Stigmatium* known to the writer that the desirability of creating a new subgenus for the reception of the species may, eventually, be found to be advisable.

The subgenus *Oxystigmatium* contains, at present, two species, *spinipenne* Kraatz and *cornutum* Hintz, both of which were described from the same locality in northern Cameroon. *S. mucronatum* may be distinguished from both the preceding species by the presence of the prominent tubercle near base of each elytron: It may be separated from *S. spinipenne* by the latter having the first fascia median, narrow and strongly oblique, and the antennæ and base of the femora brown. *S. cornutum* is much smaller (7.5 mm.), the fascia distinctly postmedian and flexuous, and the elytral apices are clothed with golden yellow pile.

AMBLYOMMA DISSIMILE KOCH, A TICK INDIGENOUS TO THE UNITED STATES (ACARINA: IXODIDAE)

By J. Bequaert
Department of Tropical Medicine, Harvard Medical School

A few months ago, Mr. H. L. Stecher, of Staten Island, presented me, through Mr. W. T. Davis, with a female tick which he had taken at Boca Ratone, Palm Beach Co., Florida. It was found on a pigmy or ground rattler, *Sistrurus miliaris* (Linné), and was attached to the left side behind the head. It was at once clear that it did not belong to any of the species known thus far from this country. Further study has shown that it is *Amblyomma dissimile* C. L. Koch, a common parasite of many different reptiles and amphibians throughout Central and South America.

As far as I have been able to find, this is the first authentic instance of *A. dissimile* being found indigenous, on a wild host, within the borders of the United States. It is true that W. A. Hooker, F. C. Bishopp and H. P. Wood (1912, U. S. Dept. Agric., Bur. Entom., Bull. 106, p. 131) saw nymphs and adults collected from iguanas at Brownsville, Texas; but they plainly state that these iguanas had been brought from the Isthmus of Tehuantepec, Mexico, so that this occurrence of the tick in Texas was merely accidental. Moreover, there seems to be no reason why *A. dissimile* should not be found in the wild state in southern Texas.

The Florida tick agrees in every respect with the many examples I have studied from Mexico and farther south. I have seen several lots of *A. dissimile* from Mexico, Guatemala, British Honduras, the Republic of Honduras, Nicaragua, Costa Rica, Panama, Colombia, Venezuela,

Trinidad, Grenada, Tobago, British Guiana, Peru, and Brazil. Neumann includes the Philippine Islands in the range, but I have difficulty in believing that this is correct. This tick attacks many different cold-blooded vertebrates, showing no decided host preference, although being found perhaps most commonly on the large toad, *Bufo marinus* Linné (often erroneously referred to in the West Indies as the "bullfrog"). At the snake farm of Lancetilla, near Tela, Rep. of Honduras, I found the snake pen literally infested with *A. dissimile* at all stages of development. I was told that any snake placed in the pen would soon carry a few of the ticks.

The northernmost localities of *A. dissimile* known to me in Mexico are Perez (in the State of Vera Cruz), on the Atlantic side (many males and females off *Bufo marinus*, collected by S. E. Meek.—Field Mus. N. H.); and the Islets of Tres Marias (opposite the State of Tepic), on the Pacific side (several males and one nymph, off *Constrictor constrictor imperator* (Daudin), from Maria Madre Isl.—M. C. Z.). Robinson (1926) records the species from Frontera in Tabasco.

I may use this opportunity to publish an interesting photograph which I owe to the courtesy of Dr. Thomas Barbour. It shows an *Iguana rhinolopha* Wiegmann bearing on the dewlap an engorged female and a male (to the right of the female) of *A. dissimile*. The host was brought alive from Ruatan Island, Rep. Honduras, to the Museum of Comparative Zoölogy, Cambridge, Mass., where it was photographed by Mr. G. Nelson.

POSTSCRIPT

Since my note was sent to the printer, I have found, at the Museum of Comparative Zoölogy, two females and two males of *A. dissimile*, taken by Mr. G. Nelson, in February, 1909, from a gopher snake, *Spilotes corais couperi* (Holbrook), at Sebastian, Indian River Co., Florida. It would seem therefore that this tick is by no means rare in Florida, but has merely been overlooked.

Fig. 1. *Iguana rhinolopha* Wiegmann, of Ruatan Island, parasitized by *Amblyomma dissimile* Koch. Photograph of living animal by Mr. G. Nelson. (Courtesy of Dr. Thomas Barbour).

A GYNERGATE OF MYRMECIA

By George S. Tulloch[1]

Although gynandromorphs of male and female—including winged female, soldier and worker ants—have been noted from time to time, there has been no case recorded of a form exhibiting a gynandromorph-like combination of female and worker characteristics. The absence of such a form has supported the trophic[2] rather than the germinal, or blastogenic hypothesis of caste determination. Such an anomaly, here designated as a *gynergate*, was recently discovered in Dr. W. M. Wheeler's collection and with his kind permission is described below. The specimen is a large Ponerine, *Myrmecia (Promyrmecia) aberrans* Forel, taken in Wagoa, New South Wales by W. W. Froggatt in 1904. The right half of the insect has characteristics of a female[3] while the left half has those of a worker.

In the head (fig. 1) the structure of the opposite sides appears to be quite typical of their respective castes, but the lateral margin of the right (female) side is distinctly concave and the posterior corner angular while the left (worker) side is convex and the posterior corner broadly rounded. The right eye is slightly larger than the left, and the clypeus is prolonged further forward on the right side than on the left.

Structural characteristics peculiar to the component forms are prominent in the thoracic region. The structure of the right (female) side (fig. 2) indicates that this specimen once bore two vestigial wings. The anterior one has been broken off (its position indicated by an insertion, W)

[1] Contribution from the Entomological Laboratory of Harvard University.

[2] Santschi (1920) Bull. Soc. Vaud. Sci. Nat., Vol. 53, p. 177.

[3] The winged forms of the subgenus *Promyrmecia* are unknown; hence, the comparison of the female structures have been made with those of related species of the subgenera *Myrmecia* and *Pristomyrmecia*.

but the hind one (VW) is still retained in the specimen. The structures which accompany wings are present, but reduced. The parascutal ridge (P) and the transcutal suture (T) are present in their usual positions. The plate (S2) covering the metathoracic spiracle may be noted as well as the upper plate (PL) of the metapleuron. The

Fig. 1. Dorsal view of gynergate. (Portion of right hind tarsus missing).

left side of the thorax (fig. 3) is distinctly that of a worker. No trace of wings or their accompanying structures can be detected. The large metathoracic spiracular plate (S2), a characteristic of all workers of this genus, is in its usual

position. The metapleuron is fused completely with the propodeum. In the dorsal aspect of the thorax (fig. 1), it will be noted that the right side appears to be large and swollen. This is probably due to the presence of wing muscles. A vestige of a scutellum distorted toward the

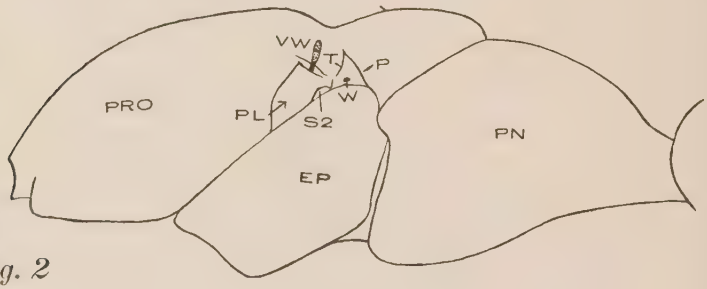


Fig. 2

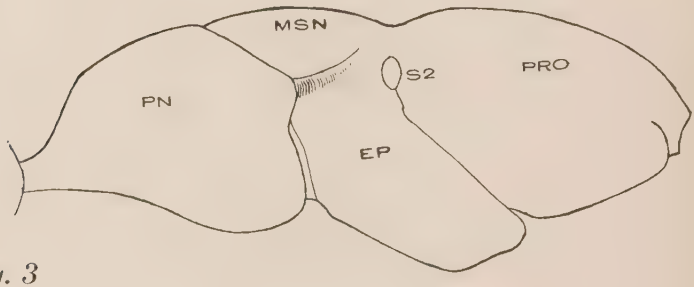


Fig. 3

Fig. 2. Right (female) side of thorax; EP, episternum; P, parascutal ridge; PL, upper plate of metapleuron; PN, pronotum; PRO, propodeum; S2, spiracular plate; T, transcutal suture; VW, vestigial wing; W, wing insertion.

Fig. 3. Left (worker) side of thorax; MSN, mesonotum.

right side may be seen in the specimen as well as a portion of a distinct metanotum.

In the abdominal region the node presents an asymmetrical appearance. The right side is longer and its corners more angular than the left side, so that each side is typical of its respective caste.

The appearance of this gynergate offers some additional evidence in favor of the germinal hypothesis of caste determination. Wheeler[4] in discussing the significance of the dinergatandromorph (soldier-male) and the ergatandromorph (worker-male) stated that although the workers and soldiers are "abortive females they behave in combination with the male like entities quite as distinct and independent as the female. This suggests that the worker and soldier are not products of nutrition but are germinally predetermined." Santschi[5] stated that this hypothesis (germinal) would be definitely determined by the discovery of a form presenting female and worker characteristics. From the finding of this ant, therefore, it would appear that the trophic hypothesis of caste determination may have to be discarded in favor of the blastogenetic hypothesis.

Brathinus varicornis Lec.

An examination of the available lists shows that the above beetle is recorded but once,—in the N. Y. List from Utica, which is apparently the type locality. On May 22, 1930, I literally unearthed a specimen while sifting wet leaves and more or less mud, taken from the edge of a small pool in a small swampy area in park land near the center of the Town of Framingham. By further sifting, and treading about in the mud and water, I secured three more specimens and on May 23 and June 2, I found six more; other visits were not productive. The time was shortly before sunset and when it had become somewhat dark in the shadows of the young trees and alders. Mr. P. J. Darlington gave me a specimen which he had taken at Exeter, N. H., by "swamp treading," June 7, 1925.

Perhaps they are nocturnal prowlers and it pleases my fancy to endow these peculiar ant-like creatures with strange and unusual habits.

C. A. Frost,
Framingham, Mass.

[4] Psyche (1919) vol. 26, pp. 7-8.
[5] *ibid.*

BOOK NOTICE

Classification of Insects. By C. T. Brues and A. L. Melander. 672 pp., 1125 figs. Published by the Museum of Comparative Zoology, Cambridge, Mass. $5.50 (paper), $6.50 (cloth).

This book consists of keys to the known families of insects and other terrestrial Arthropods, as well as some keys to subfamilies and immature forms. The large and representative genera of each family are listed. The text is divided into two parts, the first containing keys to the classes of Arthropods, orders and families of insects; the second including keys to the order and families of other terrestrial Arthropods. Technical terms are reduced to a minimum, but for the convenience of students a glossary of 330 terms and expressions has been added. The usefulness of this work for those who are just entering the field of entomology is increased by the inclusion of all synonyms of names applied to families and higher groups, and of indications of the pronunciation of the names and technical terms. Each key is followed by a bibliography of the important papers covering the subject of the key. In the writer's opinion these bibliographies, which include about 2400 references, will undoubtedly be one of the most useful features of the book. The complete index, containing over 10,000 entries, makes this publication invaluable as a reference work, as well as a laboratory manual. The authors are to be congratulated for the completion of a tedius undertaking resulting in a publication unique in entomological literature. F. M. C.

PIN-LABELS IN MULTIPLES OF 1000, ALIKE

One Dollar Per Thousand

Smallest Type. Pure White Ledger Paper. Not over 4 Lines nor 30 Characters (13 to a line) Additional Characters, 3 cents each, in total and per line, per 1000. Trimmed so one cut makes a label.

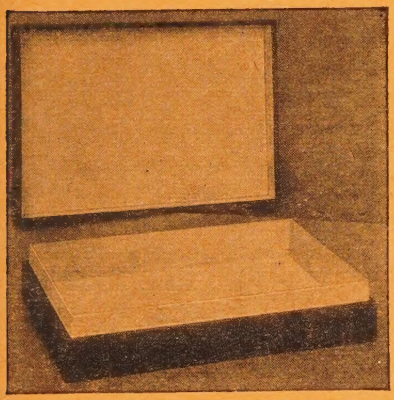
C. V. BLACKBURN, 7 Emerson St., STONEHAM 80, MASS

CAMBRIDGE ENTOMOLOGICAL CLUB

A regular meeting of the Club is held on the second Tuesday of each month (July, August and September excepted) at 7.45 p. m. in Room C-455, Biological Institute of Harvard University, Divinity Ave., Cambridge. Entomologists visiting Boston are cordially invited to attend.

WARD'S NATURAL SCIENCE ESTABLISHMENT, Incorporated,

P. O. Box 24, Beechwood Station, Rochester, N. Y.



We can now offer:

The Hood Insect Box, designed by Prof. J. Douglas Hood of the University of Rochester. This is a strong, tight box, measuring 12-3/4 x 8-3/4 x 2-3/4 inches, moderately priced, only $12.00 per dozen; single boxes, $1.25 each.

The Hood Insect Net, strongly constructed and dependable, with no soldered joints. The price of this, complete with Bruxelles bag and handle, is $1.60.

We also make the *only genuine Schmitt insect box* and the *American Entomological Co. insect pins.*

Write for catalogue No. 43 of Entomological Supplies.

THE FRANK A. WARD FOUNDATION OF NATURAL SCIENCE

of the University of Rochester

BACK VOLUMES OF PSYCHE

The Cambridge Entomological Club is able to offer for sale the following volumes of Psyche. Those not mentioned are entirely out of print.

Volumes 2, 3, 4, 5, 6, 7, 8, 9, 10; each covering a period of three years, $5.00 each.

Volumes 12, 14, 15, 17, each covering a single year, $1.00 each.

Volumes 18, 19, 20, 21, 22, 23, 24, 25, 26, each covering a single year, $1.50 each.

Volumes 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, each covering a single year, $2.00.

Orders for 2 or more volumes are subject to a discount of 10%.

Orders for 10 or more volumes subject to a discount of 20%.

A set of all the volumes available (34 in all) will be sold for $67.00.

All orders should be addressed to

F. M. CARPENTER, Associate Editor of Psyche,
Museum of Comparative Zoölogy,
Department of Entomology,
Cambridge, Mass.